# CITY OF WACO CONVENTION CENTER HVAC REPLACEMENT PHASE 2

3

SHEET LIST							
SHEET	SHEET TITLE	ISSUED					
NUMBER		REVIEW	PERMIT	REVISION 1			
M001	MECHANICAL GENERAL	2020-10-18					
M002	MECHANICAL SPECIFICATIONS	2020-10-18					
D101	DEMOLITION MECHANICAL ROOM	2020-10-18					
D102	DEMOLITION ROOF	2020-10-18					
M101	NEW WORK MECHANICAL ROOM	2020-10-18					
M102	NEW WORK ROOF	2020-10-18					
M501	DETAILS	2020-10-18					
M502	DETAILS	2020-10-18					
M503	STRUCTURAL REPORT	2020-10-18					
M601	SCHEDULES	2020-10-18					

 $\cup$ 

2

2

100 Washington Ave Waco, TX 76701

RFB 2022-091 City of Waco Convention Center HVAC Changeout - Phase 2

4

SHEET LIST							
SHEET	SHEET TITLE		ISSUED				
NUMBER		REVIEW	PERMIT	REVISION 1			
E001	GENERAL CONDITIONS ELECTRICAL	2020-10-18					
ED101	DEMOLITION ELECTRICAL MECHANICAL ROOM	2020-10-18					
ED102	DEMOLITION ELECTRICAL ROOF	2020-10-18					
E101	NEW WORK ELECTRICAL MECHANICAL ROOM	2020-10-18					
E102	NEW WORK ELECTRICAL ROOF	2020-10-18					

3

1 of 10

4



	GENERAL SYN	MBOLS	DUCT SYMBOLS						
$\begin{pmatrix} x \\ x - x \end{pmatrix}$	<ul> <li>EQUIPMENT IDENTIT (SEE EQUIPMENT AE LIST AND SCHEDULE</li> <li>EQUIPMENT NUMBER (IF APPLICABLE)</li> <li>INDICATES DETAIL, F DIAGRAM(APPLIES C ON DRAWINGS)</li> <li>INDICATES DRAWING</li> </ul>	Y BBREVIATION ES) R PLAN, SECTION, AND/OR DNLY WHERE INDICATED G ON WHICH		20"ø 20"ø 20"ø	EXISTING EQUIPMENT OR DUCTWORK TO BE REMOVED. EXISTING DUCTWORK TO REMAIN NEW DUCTWORK MANUAL VOLUME DAMPER (MVD) MOTOR OPERATED DAMPER (MOD)	<u>SINGLE LINE</u> 55 1 55 5			
TYP	INDICATES TYPICAL (APPLIES TO ALL CO DRAWINGS)	DETAIL NTRACT			ACCESS DOOR	<u>ح AD</u> ج ۲			
×	INDICATES DRAWING DETAIL APPEARS		I IIII		RADIUS ELBOW (R=1.5)				
X X	INDICATES SECTION INDICATES ON WHIC SECTION APPEARS	H DRAWING			ELBOW W/ TURNING VANES	Ĺ			
$\hat{\mathbf{x}}$	INDICATES REVISION	N & NUMBER			REC. BRANCH DUCT TAKE-OFF W/ VD	<u>د ۲</u> ج			
	CONNECT NEW TO E	XISTING			ROUND BRANCH DUCT TAKE-OFF W/ VD	) <u>5                                    </u>			
$\bigcirc$	DEMOLISH TO THIS F	POINT		D R	RISE OR DROP DIRECTION OF	$S \rightarrow A$			
	CONTROL DAMPER-				FLEXIBLE CONNECTION (FXC)	ss			
	OPPOSED BLADE WI	TH ACTUATOR		A / CFM	DIFFUSER	S A / CFM			
- <u>t</u> -•	DOOR LOUVER (FREI REQUIRED INDICATE SQUARE FEET)	E AREA D IN	Γ		SUPPLY AIR GRILLE (G) OR SUPPLY AIR REGISTER (R)				
$\boxtimes$	SUPPLY AIR	ST AIR		<u>با</u>	PIPING SYMBOLS				
(F)- (S)- (S)- (T)-	<ul> <li>FIRE DAMPER W/ ACC DOOR</li> <li>SMOKE DAMPER W/ / DOOR</li> <li>SMOKE DETECTOR</li> <li>THERMOSTAT</li> </ul>	CESS ACCESS		O PIPE > PIPE DIRE GAT BAL BAL 	E RISING UP E DROPPING DOWN ECTION OF FLOW TE VALVE TERFLY VALVE L VALVE COMATIC CONTROL VALVE TOMATIC CONTROL VALVE (3-WAY) ESSURE REDUCING VALVE (PSI)	<ul> <li>STRAINER</li> <li>FLOW SWITCH</li> <li>THERMOMETER</li> <li>PRESSURE GAUGE</li> <li>PIPE WELL</li> </ul>			
AFF ABOVE AFG ABOVE AFR ABOVE AHU AIR HAN AI ANALOO AO ANALOO BOD BOTTOM BOP BOTTOM BOP BOTTOM BHP BRAKE BTU BRITISH BTUH BRITISH BTUH BRITISH C COMMC CD CONDEI CFM CUBIC F CH CHILLEF	INISHED FLOOR INISHED GRADE INISHED GRADE INISHED ROOF DLING UNIT INPUT OUTPUT AUTO TIC OF DUCT OF DUCT OF PIPE IORSE POWER THERMAL UNIT THERMAL UNIT PER N ISATE EET PER MINUTE	HANICAL ABEEATENTERING AIR TEMPERAESPEXTERNAL STATIC PRESEEWTENTERING WATERTEMPERATUREERVENERGY RECOVERYVENTILATORFCFAIL CLOSEDFCFAN COIL (EXISTING)FCUFAN COIL UNITFDFIRE DAMPERFFFLOW FEEDBACK/STATUSSIGNALFLAFULL LOAD AMPSFOFAIL OPENFPMFEET PER MINUTEFTFEETGPMGALLONS PER MINUTE	SREVIA TURE MOCP SURE NC NO NTS OBD OA P PF S PF S PRV PRS PSI PVC RA RH	A TIO MAXIMUM ( PROTECTIO NORMALLY NORMALLY NORMALLY NOR TO SC OPPOSED I OUTDOOR PRESSURE PROPORTIN FEEDBACK PRESSURE PRESSURE PRESSURE STATION POUNDS PI POLYVINYL RETURN AI RELATIVE I	NSLEGEND OVER CURRENT ONS CLOSED COPEN CALE ONAL, LINEARIZE CARACALE CARACALE CARACALE CONAL, LINEARIZE CARACALE CALORIDE CARACALE CHLORIDE IR HUMIDITY	E R RESET L			

AFF	ABOVE FINISHED FLOOR	EAT	ENTERING AIR TEMPERATURE	MOCP	MAXIMUM OVER CURRENT	WB	WET BULB
AFG	ABOVE FINISHED GRADE	ESP	EXTERNAL STATIC PRESSURE		PROTECTIONS	WG	WATER GAUGE
AFR	ABOVE FINISHED ROOF	EWT	ENTERING WATER	NC	NORMALLY CLOSED	WR	CHILLED WATER RESET
AHU	AIR HANDLING UNIT		TEMPERATURE	NO	NORMALLY OPEN		4-20 mA SIGNAL
AI	ANALOG INPUT	ERV	ENERGY RECOVERY	NTS	NOT TO SCALE	W/	WITH
AO	ANALOG OUTPUT AUTO		VENTILATOR	OBD	OPPOSED BLADE DAMPER	W/O	WITHOUT
	AUTOMATIC	FC	FAIL CLOSED	OA	OUTDOOR AIR		
BOD	BOTTOM OF DUCT	FC	FAN COIL (EXISTING)	Р	PRESSURE		
BOP	BOTTOM OF PIPE	FCU	FAN COIL ÙNIT	PF	PROPORTIONAL, LINEARIZE		
BHP	BRAKE HORSE POWER	FD	FIRE DAMPER		FEEDBACK, 4-20mA SIGNAL		
BTU	BRITISH THERMAL UNIT	FF	FLOW FEEDBACK/STATUS	PRV	PRESSURE REDUCING VALVE		
BTUH	BRITISH THERMAL UNIT PER		SIGNAL	PRS	PRESSURE REDUCING		
	HOUR	FLA	FULL LOAD AMPS		STATION		
С	COMMON	FO	FAIL OPEN	PSI	POUNDS PER SQUARE INCH		
CD	CONDENSATE	FPM	FEET PER MINUTE	PVC	POLYVINYL CHLORIDE		
CFM	CUBIC FEET PER MINUTE	FT	FEET	RA	RETURN AIR		
СН	CHILLER	GPM	GALLONS PER MINUTE	RH	RELATIVE HUMIDITY		
CHWS	CHILLED WATER SUPPLY	Н	HUMIDITY	RPM	REVOLUTIONS PER MINUTE		
CHWR	CHILLED WATER RETURN	HS	HUMIDISTAT	RS/L	REFRIGERANT		
CO2	CARBON DIOXIDE	HP	HEAT PUMP		SUCTION/LIQUID		
COP	COEFFICIENT OF	HP	HORSEPOWER	RTU	ROOFTOP PACKAGED UNIT		
	PERFORMANCE	HWS	HOT WATER SUPPLY	SA	SUPPLY AIR		
CU	CONDENSING UNIT	HPS	HIGH PRESSURE STEAM	SF	SQUARE FEET		
DAC	DEHUMIDIFICATION AHU	HWR	HOT WATER RETURN	SS	START/STOP SIGNAL		
DB	DRY BULB	IAQ	INDOOR AIR QUALITY	S.S.	STAINLESS STEEL		
DCU	DEHUMIDIFICATION CU	IN	INCH	SP	STATIC PRESSURE		
DDC	DIRECT DIGITAL CONTROL	KW	KILOWATT	Т	TEMPERATURE		
DEGF	DEGREE FAHRENHEIT	LAT	LEAVING AIR TEMPERATURE	V-PH	VOLTAGE-PHASE		
DI	DIGITAL INPUT	LBS	POUNDS	TD	TIME DELAY		
DN	DOWN	LPS	LOW PRESSURE STEAM	TS	TEMPERATURE SENSOR		
DO	DIGITAL OUTPUT	LPR	LOW PRESSURE RETURN	TSP	TOTAL STATIC PRESSURE		
DWG	DRAWING	LWT	LEAVING WATER	UH	UNIT HEATER		
DP	DIFFERENTIAL PRESSURF		TEMPERATURE	UNO	UNLESS OTHERWISE NOTED		
EA	EXHAUST AIR	М	MOTORIZED	VD	VOLUME DAMPER		
EER	ENERGY EFFICIENCY RATIO	MBH	THOUSAND BTUH	VFD	VARIABLE FREQUENCY DRIVE		
FF	EXHAUST FAN	MCA	MINIMUM CIRCUIT AMPACITY	V/PH	VOLTS/PHASE		

RFB 2022-091 City of Waco Convention Center HVAC Changeout - Phase 2



## **GENERAL NOTES**

- THE SPACES SERVED BY THIS EQUIPMENT SHALL REMAIN IN SERVICE AND AVAILABLE FOR OWNER SCHEDULING DURING THE COURSE OF THE PROJECT. THE CONTRACTOR IS RESPONSIBLE TO SCHEDULE ALL WORK TO COINCIDE WITH OWNER SPACE USE. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING TEMPORARY MEANS OF SPACE CONDITIONING WHEN OWNER USE REQUIRES. THE SUCCESSFUL BID RESPONSE WILL INCLUDE THE CONTRACTOR'S WORK PHASING PLAN AND TEMPORARY CONDITIONING PLAN TO PERMIT THE REPLACEMENT OF THE EQUIPMENT IN THIS SCOPE OF WORK WITHOUT INTERRUPTION OF USE TO THE OWNER.
- 2. DO NOT SCALE FROM THESE DRAWINGS. EXACT DIMENSIONS SHALL BE TAKEN FROM ARCHITECTURAL DRAWINGS.
- 3. ALL INDICATED WORK SHALL BE PERFORMED BY THE MECHANICAL CONTRACTOR UNLESS OTHERWISE NOTED.
- 4. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF ALL APPLICABLE CODES AND REGULATIONS INCLUDING BUT NOT LIMITED TO NATIONAL, CITY, STATE AND LOCAL ORDINANCES WHICH MAY BE IN EFFECT. ALL MECHANICAL MATERIALS, INSTALLATION PROCEDURES AND SYSTEM LAYOUTS SHALL BE APPROVED BY ALL APPLICABLE CODE ENFORCEMENT AUTHORITIES HAVING JURISDICTION, AND IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO PAY FOR ALL NECESSARY PERMITS AND APPROVALS FOR THIS INSTALLATION.
- 5. IT IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO REVIEW THESE PLANS AND SPECIFICATIONS, AS WELL AS THE RELATED PLUMBING, FIRE PROTECTION, ELECTRICAL, STRUCTURAL, ARCHITECTURAL, INTERIOR DECOR AND SITE ENGINEERING DRAWINGS TO BECOME FAMILIAR WITH THE FULL PROJECT SCOPE PRIOR TO BID. IN ADDITION, THIS CONTRACTOR MUST COORDINATE WITH AN OWNER REPRESENTATIVE TO FULLY UNDERSTAND ALL REQUIREMENTS WHICH MAY NOT BE SPECIFIED HEREIN AND WHICH THE OWNER MAY CONSIDER PART OF THIS CONTRACT. DURING THE COURSE OF CONSTRUCTION COORDINATION AND ACTUAL CONSTRUCTION, IT IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO WORK CLOSELY WITH ALL ACCOMPANYING CONTRACTORS AND TRADESMEN IN ORDER TO ENSURE A SMOOTH RUNNING AND CAREFULLY COORDINATED INSTALLATION.
- ANY DISCREPANCIES OR INADEQUACIES WITHIN THESE BID DOCUMENTS OR BETWEEN THESE BID DOCUMENTS AND THE RELATED PLUMBING. FIRE PROTECTION. ELECTRICAL, STRUCTURAL, ARCHITECTURAL, INTERIOR DECOR AND SITE ENGINEERING DRAWINGS, OR BETWEEN THESE BID DOCUMENTS AND FIELD CONDITIONS MUST BE BROUGHT TO THE ATTENTION OF THE OWNER, ARCHITECT AND ENGINEER PRIOR TO BID SUBMISSION.
- WHERE CONFLICTS EXIST BETWEEN THE INFORMATION INCLUDED IN THESE DRAWINGS OR BETWEEN INFORMATION PROVIDED IN THESE DRAWINGS AND THE PROJECT SPECIFICATIONS OR WITHIN THE PROJECT SPECIFICATIONS. THE MORE STRINGENT AND/OR HIGHEST COST REQUIREMENTS SHALL APPLY. SHOULD THE CONTRACTOR REQUIRE FURTHER CLARIFICATION, AN RFI SHALL BE SUBMITTED FOR CLARIFICATION. WHERE CONFLICTS DO EXIST, THE PROJECT ENGINEER OF RECORD SHALL HAVE THE SOLE DISCRETION AND RIGHT TO PROVIDE INTERPRETATION OF INTENT OF THE CONTRACT DOCUMENTS AS REQUIRED AND THIS INTERPRETATION SHALL SERVE TO DIRECT THE CONTRACTOR IN ACCORDANCE WITH THE IMPLIED INTENT OF THE CONSTRUCTION DOCUMENTS WITHOUT ADDITIONAL COST TO THE PROJECT.
- . THE MECHANICAL CONTRACTOR SHALL PROVIDE A COMPLETE SET OF RECORD "AS-BUILT" DRAWINGS INDICATING THE PRECISE LOCATION OF ALL SYSTEMS, EQUIPMENT CONCEALED OR EMBEDDED PIPING, PIPING CONNECTIONS AND ACCESS DOORS. THESE DRAWINGS SHALL ALSO INCLUDE ALL CHANGES AND DEVIATIONS FROM THE BID DOCUMENTS.
- 9. CONTRACTOR SHALL COORDINATE EXACT LOCATIONS OF NEW MECHANICAL EQUIPMENT WITH NEW LIGHT LOCATIONS AND TILE LOCATIONS. REFER TO ARCHITECT'S REFLECTED CEILING PLAN LAYOUT.
- 10. ALL DUCT DIMENSIONS SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS. AIR VELOCITY SHALL NOT EXCEED 650 FEET PER MINUTE IN DWELLING UNITS.
- 11. RUN ALL DUCTWORK AND PIPING WITH AS FEW OFFSETS AS POSSIBLE THROUGHOUT THE ENTIRE BUILDING. COORDINATE AND VERIFY WITH OTHER CONTRACTORS AS NOT TO INTERFERE WITH PLUMBING, FIRE PROTECTION PIPING, LIGHTING SYSTEMS, ETC.
- 12. ALL REQUIRED OFFSETS, RISES AND DROPS DUE TO POSSIBLE OBSTRUCTIONS OF PIPE RUNS ARE NOT NECESSARILY SHOWN. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRANSITIONS, FITTINGS, ELBOWS, DUCTWORK, PIPING, SUPPORTS, ETC. NECESSARY FOR A PROPER INSTALLATION AND OPERATION OF NEW HVAC SYSTEM. MECHANICAL CONTRACTOR SHALL INCLUDE A CONTINGENCY IN HIS BID TO OFFSET ANY COST REQUIRED FOR ADDITIONAL FITTINGS AND LABOR THAT MAY BE REQUIRED.
- 13. ALL EXPOSED HORIZONTAL AND VERTICAL DUCTWORK AND PIPING SHALL BE INSTALLED IN A NEAT ARRANGEMENT IN LOCATIONS WHICH ARE THE MOST INCONSPICUOUS. VERTICAL DROPS SHALL BE KEPT TO AN ABSOLUTE MINIMUM AND THEIR FINAL LOCATIONS SHALL BE COORDINATED AND RUN WITHIN CHASES, WALLS, SOFFITS WITH OTHER MECHANICAL/ ELECTRICAL FEEDS. ALL SUCH LOCATIONS ARE TO BE REVIEWED WITH AN OWNER REPRESENTATIVE AND ARCHITECT PRIOR TO INSTALLATION.
- 14. DUCT SMOKE DETECTORS SHOWN ON PLANS ARE DIAGRAMMATIC. REFER TO MANUFACTURERS INSTRUCTIONS FOR EXACT/OPTIMUM LOCATION IN DUCTWORK. DUCT SMOKE DETECTORS SHALL BE PURCHASED BY THE ELECTRICAL CONTRACTOR, AND INSTALLED BY THE MECHANICAL CONTRACTOR. WIRING INSTALLATION SHALL BE BY THE FIRE ALARM CONTRACTOR.
- 15. CONNECTION TO ANY GAS FIRED EQUIPMENT TO BE BY THE PLUMBING CONTRACTOR, REGARDLESS OF WHO PROVIDES EQUIPMENT.
- 16. CONDENSATE SHALL BE PIPED FULL SIZE TO THE NEAREST APPROVED FLOOR OR HUB DRAIN VIA AN INDIRECT CONNECTION.
- 17. INSULATE EACH REFRIGERANT LINESET WITH 1-INCH FLEXIBLE, CLOSED CELL ELASTOMERIC INSULATION. PROVIDE ALUMINUM JACKETING FOR EXPOSED PIPING. PROVIDE EXTERIOR PIPING PORTS WITH LOCKING TYPE TAMPER RESISTANT CAPS.
- 18. MOUNT ALL THERMOSTATS ABOVE FINISHED FLOOR AT HEIGHT APPROVED BY ARCHITECT. COORDINATE LOCATION WITH ARCHITECTURAL INTERIOR ELEVATIONS.
- 19. INSTALL SLEEVES FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS, INSTALL CHROME PLATED ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS. REFER TO DETAIL SHEET FOR ROOF PENETRATIONS.
- 20. WOOD SUPPORTS FOR PIPING OR DUCTWORK ROUTED ALONG THE ROOF ARE NOT ACCEPTABLE, REFER TO DETAILS FOR PROPER SUPPORTS.
- 21. ALL PLUMBING VENTS AND BUILDING EXHAUST SHALL BE LOCATED A MINIMUM OF 10 FEET FROM BUILDING INTAKES (INCLUDING OPERABLE WINDOWS).
- 22. MAINTAIN MANUFACTURER'S RECOMMENDED SERVICE CLEARANCES AROUND EQUIPMENT AT A MINIMUM. DO NOT ROUTE PIPING, DUCTWORK, CONTROL WIRE, ETC. THROUGH THE SERVICE CLEARANCE AREAS.
- 23. REFER TO PROJECT SPECIFICATIONS, FOR ADDITIONAL INFORMATION.
- 24. ALL MECHANICAL EQUIPMENT SHALL BE PROVIDED WITH A FACTORY DISCONNECT SWITCH. STARTER, VFD OR MOTOR RATED SWITCH AS REQUIRED FOR CODE COMPLIANT OPERATION OF ALL MOTORIZED EQUIPMENT IN ACCORDANCE WITH CODE AND THE DESIGN INTENT ASSOCIATED WITH THESE DRAWINGS. COORDINATE ALL DISCONNECTS AND STARTER REQUIREMENTS WITH THE PROJECT ELECTRICAL CONTRACTOR PRIOR TO BID TO ENSURE A COORDINATED INSTALLATION.
- 25. CONTRACTOR SHALL INSTALL ALL EQUIPMENT WITH VIBRATION ISOLATION AND SEISMIC SUPPORTS IN ACCORDANCE WITH ASHRAE APPLICATION HANDBOOK CHAPTER 48 - NOISE AND VIBRATION CONTROL TABLE 47 AND CODES.

## **DEMOLITION NOTES**

- 1. COORDINATE HVAC DEMOLITION WITH OTHER TRADES AND GENERAL CONTRACTOR. DO NOT DEMOLISH EQUIPMENT OR COMPONENTS WITHOUT APPROVAL.
- 2. UNDER NO CIRCUMSTANCE SHALL DEMOLITION CAUSE DAMAGE OR REMOVAL IN WHOLE OR IN PART OF ANY STRUCTURAL MEMBER WITHOUT EXPRESS APPROVAL OF THE GENERAL CONTRACTOR.
- CAP AND PROTECT ANY EXPOSED EQUIPMENT, DUCT, PIPE OR ELECTRICAL CABLE / CONDUIT THAT RESULTS FROM DEMOLITION. UNDER NO CIRCUMSTANCE WILL DEMOLITION RESULT IN THE PERMANENT EXPOSURE OF ANY CHARGED OR LIVE COMPONENT OR ANY EQUIPMENT TO BE RE-USED.
- 4. PROTECT ANY EQUIPMENT, SYSTEM, OR COMPONENT THEREOF THAT SHALL BE RE-USED.

2 of 10

COORDINATE DISPOSAL OF ALL REMOVED ITEMS WITH THE GENERAL CONTRACTOR. TURN OVER ANY COMPONENTS TO THE OWNER AS DESIGNATED IN CLEAN CONDITION, WITHOUT DAMAGE, AND WITH OPENING SEALED. FURNISH RECEIPTS OF PROPER DISPOSAL OF ALL ITEMS REMOVED TO THE GENERAL CONTRACTOR UPON REQUEST. RECEIPTS SHALL INDICATE DISPOSAL IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REGULATIONS.





# **KEYED NOTES**

REMOVE EXISTING EQUIPMENT. DISCONNECT EXISTING PIPING AND WIRING AND CAP FOR RECONNECTION.

3 REMOVE EXISTING RETURN AIR, OUTSIDE AIR AND RELIEF AIR DAMPERS.

5 REMOVE EXISTING DOMESTIC GAS WATER HEATER AND ASSOCIATED RPZ BFP AND FLUE.

6 INSPECT, CLEAN AND REPAIR OUTSIDE AIR LOUVER AND DUCT RISER AS REQUIRED. RETURN TO SERVICE.

7 PROTECT EXISTING DUCT UV SYSTEM DURING WORK. SYSTEM TO RETURN TO SERVICE.

10 BRANCH RUN OUT TO AHU WILL BE RELOCATED IN NEW WORK. REMOVE BRACH RUN OUT AND PROTECT EXISTING MAIN TAPS FOR RETURN TO SERVICE.





3 of 10





	1	$\rangle$	INS AN
	2	$\rangle$	INS
	3		INS DA RE
	4		CL RE
	5	$\rangle$	INS FL FL
	6		HC W(
	7	$\rangle$	FA TC
	8		NE CC All

 $\cap$  $\bigcirc$ 

R

2

#### RFB 2022-091 City of Waco Convention Center HVAC Changeout - Phase 2

3



- ISTALL NEW EQUIPMENT. RECONNECT EXISTING PIPING AND WIRING.
- NSTALL NEW REFRIGERANT PIPING.
- ISTALL NEW RETURN AIR, OUTSIDE AIR AND RELIEF AIR AMPERS AND OPERATORS. INSPECT AND EPAIR/REPLACE FIRE SMOKE DAMPERS AS REQUIRED.
- LEAN EXISTING OUTSIDE AIR INTAKE LOUVER AND ETURN TO SERVICE.
- NSTALL NEW GAS WATER HEATER AND RPZ BFP. NEW LUE ROUTED THROUGH ROOF WIHT NEW WEATHER CAP. LASH AND SEAL.
- IOT WATER BOILER SYSTEM IS NOT IN THE SCOPE OF ORK. PROTECT AT ALL TIMES.
- ABRICATE NEW INSULATED RETURN PLENUM. OP-CONNECT EXISTING MIXED AIR DUCT. TO PLENUM.
- EW INSULATED SUPPLY DUCT RISER FROM TOP ONNECTION OF AHU. TRANSITION TO EXISTING SUPPLY AIR DUCT.



5 of 10



6 of 10



7 of 10

RFB 2022-091 City of Waco Convention Center HVAC Changeout - Phase 2

1. SINGLE ZONE AHU (TYPICAL OF 6)       HEATING COIL VALVE:         THE CONTROLLER SHALL MEASURE THE ZONE	
RUN CONDITIONS - SCHEDULED: THE UNIT SHALL RUN ACCORDING TO A USER DEFINABLE TIME MODULATE THE HEATING COIL VALVE TO MAIN SETPOINT	ITAIN ITS HEATING
SCHEDULE IN THE FOLLOWING MODES:       • OCCUPIED MODE: THE UNIT SHALL MAINTAIN       THE HEATING SHALL BE ENABLED WHENEVER:         • A 75°F (ADJ.) COOLING SETPOINT       • OUTSIDE AIR TEMPERATURE IS LESS TH         • A 70°F (ADJ.) HEATING SETPOINT.       • AND THE ZONE TEMPERATURE IS BELO'         • AND THE SUPPLY FAN STATUS IS ON	: HAN 65°F (ADJ.). W HEATING SETPOINT.
UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL     AND THE COOLING IS NOT ACTIVE.     MAINTAIN	
• A 85°F (ADJ.) COOLING SETPOINT.       THE HEATING COIL VALVE SHALL OPEN WHENE         • A 55°F (ADJ.) HEATING SETPOINT.       (IF PRESENT) IS ON.	EVER THE FREEZESTAT
ALARMS SHALL BE PROVIDED AS FOLLOWS: • HIGH ZONE TEMP: IF THE ZONE TEMPERATURE IS GREATER THAN THE COOLING SETPOINT BY A USER DEFINABLE AMOUNT (ADJ.). MIXED AIR DAMPERS: THE MIXED AIR DAMPERS SHALL OPEN TO PRO OUTSIDE AIR VENTILATION ANYTIME THE UNIT MIXED AIR DAMPERS SHALL CLOSE 5SEC (ADJ. FAN STOPS.	OVIDE MINIMUM IS OCCUPIED. THE .) AFTER THE SUPPLY
LOW ZONE TEMP: IF THE ZONE TEMPERATURE IS LESS THAN     THE HEATING SETPOINT BY A USER DEFINABLE AMOUNT     (ADJ.).     IF OPTIMAL START UP IS AVAILABLE, THE OUTS     SHALL CLOSE AND THE RETURN AIR DAMPER S	BIDE AIR DAMPER SHALL OPEN.
C ZONE SETPOINT ADJUST: THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING AND COOLING SETPOINTS AT THE ZONE SENSOR. MINIMUM OUTSIDE AIR VENTILATION - FIXED PE THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A (ADJ.) DURING BUILDING OCCUPIED HOURS AN UNOCCUPIED HOURS. DAMPERS SHALL MODU CO2 SENSORS IN THE ROOM POSITIONED IN TH	ERCENTAGE: A MINIMUM POSITION ID BE CLOSED DURING JLATE BASED UPON HE RETURN AIR PATH.
ZONE OPTIMAL START: THE OA DAMPERS SHALL MODULATE FROM MIN THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING	NIMUM AT 1200 PPM TO
COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD. PERIOD. PREFILTER DIFFERENTIAL PRESSURE MONITOR THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE MONITOR THE CONTROLLER SHALL MONITOR THE DIFFERENTIAL PRESSURE MONITOR ACROSS THE PREFILTER.	R: RENTIAL PRESSURE
ZONE UNOCCUPIED OVERRIDE: A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT	
TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN       • PREFILTER CHANGE REQUIRED: PREFIL         OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE       • PRESSURE EXCEEDS A USER DEFINABL         EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL       • PREFILTER CHANGE REQUIRED: PREFIL	.TER DIFFERENTIAL .E LIMIT (ADJ.).
AUTOMATICALLY RETURN TO THE SCHEDULE.       MIXED AIR TEMPERATURE:         THE CONTROLLER SHALL MONITOR THE MIXED         FREEZE PROTECTION:       AND USE AS REQUIRED FOR ECONOMIZER CON         THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON       OR PREHEATING CONTROL (IF PRESENT).         RECEIVING A FREEZESTAT STATUS.       FREEZE PROTECTION:	D AIR TEMPERATURE NTROL (IF PRESENT)
ALARMS SHALL BE PROVIDED AS FOLLOWS: RETURN AIR SMOKE DETECTION:	R TEMPERATURE IS
THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON       GREATER THAN 90°F (ADJ.).         RECEIVING A RETURN AIR SMOKE DETECTOR STATUS. A       • LOW MIXED AIR TEMP: IF THE MIXED AIR         SUPERVISORY SIGNAL SHALL BE SENT TO THE FACP.       • LOW MIXED AIR TEMP: IF THE MIXED AIR	R TEMPERATURE IS
Bit Supply air smoke detection:       Supply air smoke detection:       Return air humidity:         The Unit shall shut down and generate an alarm upon       Return air humidity:         Receiving a supply air smoke detector status. A       The controller shall monitor the return supervisory signal shall be sent to the face.         Bit Supervisory signal shall be sent to the face.       OR humidity control (if present).	RN AIR HUMIDITY AND DL (IF PRESENT)
SUPPLY FAN: THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES. TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.ALARMS SHALL BE PROVIDED AS FOLLOWS: • HIGH RETURN AIR HUMIDITY: IF THE RET GREATER THAN 70% (ADJ.).• LOW RETURN AIR HUMIDITY: IF THE RET LESS THAN 35% (ADJ.).	TURN AIR HUMIDITY IS FURN AIR HUMIDITY IS
<ul> <li>ALARMS SHALL BE PROVIDED AS FOLLOWS:</li> <li>SUPPLY FAN FAILURE: COMMANDED ON, BUT THE STATUS IS</li> <li>OFF.</li> <li>SUPPLY FAN IN HAND: COMMANDED OFF, BUT THE STATUS IS</li> <li>AND USE AS REQUIRED FOR ECONOMIZER COI</li> </ul>	RN AIR TEMPERATURE NTROL (IF PRESENT).
SUPPLY FAN RUNTIME EXCEEDED: STATUS RUNTIME EXCEEDS     A USER DEFINABLE LIMIT (ADJ.).	N AIR TEMPERATURE IS
COOLING STAGES:       • LOW RETURN AIR TEMP: IF THE RETURN         THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND       LESS THAN 45°F (ADJ.).         STAGE THE COOLING TO MAINTAIN ITS COOLING SETPOINT. TO       DEPLYENT OUCDER OVER UNC. THERE A HOLD PROVIDE A HOLD PROVIDA HOLD PROVIDA HOLD PROVIDA HOLD PROVIDE A HOLD PROVIDA HOLD PROVID	N AIR TEMPERATURE IS
DEFINABLE (ADJ.) DELAY BETWEEN STAGES, AND EACH STAGE SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME. SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.	LY AIR TEMPERATURE.
THE COOLING SHALL BE ENABLED WHENEVER:	AIR TEMPERATI IRE IS
<ul> <li>OUTSIDE AIR TEMPERATURE IS GREATER THAN 60°F (ADJ.).</li> <li>AND THE ECONOMIZER (IF PRESENT) IS DISABLED OR FULLY OPEN.</li> <li>LOW SUPPLY AIR TEMP: IF THE SUPPLY</li> </ul>	AIR TEMPERATURE IS
<ul> <li>AND THE ZONE TEMPERATURE IS ABOVE COOLING SETPOINT.</li> <li>AND THE SUPPLY FAN STATUS IS ON.</li> </ul>	
AND THE HEATING IS NOT ACTIVE.	

2

RFB 2022-091 City of Waco Convention Center HVAC Changeout - Phase 2







	Ha	Hardware Points									
Point Name	AI	AO	BI	во	AV	BV	Loop	Sched	Trend	Alarm	Show On Graphic
lixed Air Temp	x								х		х
refilter Differential Pressure	x								х		
eturn Air Humidity	x								x		х
eturn Air Temp	x								x		х
upply Air Temp	x								x		х
one Setpoint Adjust	x										x
one Temp	x								x		x
leating Valve		x							x		x
reezestat			х						x	x	x
eturn Air Smoke Detector			х						x	x	x
upply Air Smoke Detector			х						x	x	x
upply Fan Status			х						x		x
one Override			х						x		x
ooling Stage 1				x					x		x
cooling Stage 2				x					x		x
cooling Stage 3				x					x		x
cooling Stage 4				x					x		x
lixed Air Dampers				x							x
upply Fan Start/Stop				x					x		x
ooling Setpoint					x				x		x
leating Setpoint					x				x		x
chedule	-							x			
compressor Runtime Exceeded										x	
ligh Mixed Air Temp										x	
igh Return Air Humidity										x	
igh Return Air Temp										x	
igh Supply Air Temp										x	
ligh Zone Temp										x	
ow Mixed Air Temp										x	
ow Return Air Humidity										x	
ow Return Air Temp										x	
ow Supply Air Temp										x	
ow Zone Temp										x	
refilter Change Required										x	x
upply Fan Failure										x	
upply Fan in Hand										x	
upply Fan Runtime Exceeded										x	
Totals	7	1	5	6	2	0	0	1	19	18	21
Total Hardword	(10)		-		_			Total	Softwa	ro (40)	

8 of 10

Sheet sheet index

21 OCT 2022



#### August 3, 2022

Jayson Ritch GTX Engineering PO Box 1336 Salado, Texas

Re: Structural Engineering – Rooftop Unit Replacement Waco Convention Center 100 Washington Avenue Waco, Texas Gessner Engineering Job Number: 22-0835 GTX Engineering Job Number: 22-16

Dear Mr. Ritch:

A structural verification of the existing roof structure supporting condensing units slated for replacement was requested on July 8, 2022. The verification was requested to determine if the existing roof structure has sufficient capacity to support the anticipated replacement condensing units. The replacement rooftop condensing units (CU) are anticipated to be located in the same location as the existing condensing units and shall utilize existing support frames, as applicable. The existing structure for this portion of the roof is understood to be constructed of steel bar joists and metal roof deck. Structural construction documents for this portion of the building were not available for this verification, so structural verification was conducted per provisions provided by the International Existing Building Code 2018, as adopted by the City of Waco.

Existing unit and new unit information was provided through site visit pictures taken June 23, 2022 and new unit technical data sheets dated July 5, 2022. Where existing unit dimensions and operating weights were not available through the attached data plate on-site, applicable product data sheets were found and utilized for this verification through Carrier Corporation.

This verification and applicable recommendations are provided as an aid to the client in completing a successful project. Gessner Engineering neither extends nor implies any warranty as a result of this observation or any repair performed upon this building. We trust that this letter satisfies your project needs. If you have any questions with respect to this letter, please contact us.

Sincerely, GESSNER ENGINEERING, LLC F-745

Interier 44 Victoria L. Wittman, M.E., P.E.



BRYAN • BRENHAM • FORT WORTH • GEORGETOWN • SAN ANTONIO Corporate: 401 West 26th Street, Bryan, Texas 77803 • 1-877-GESSNER • www.gessnerengineering.com

CIVIL CONSTRUCTION MATERIALS TESTING GEOTECHNICAL STRUCTURAL SURVEYING

#### RFB 2022-091 City of Waco Convention Center HVAC Changeout - Phase 2

4

## UNIT INFORMATION

The rooftop condensing units located in the area shown in the circled area in Figure 1 are planned for replacement with similarly sized units. A total of (6) units shall be replaced. Comparisons of the existing unit dimensions and operating weights are provided with guidance for any stiffening or support requirements where new unit weights may exceed the existing unit weights. Existing supports are anticipated to be re-used where applicable, and shall be cleaned and repaired for new unit installation.

Where new units are shown to have an equivalent pound pe square foot (PSF) weight percentage less than the existing units, no additional stiffening or supports are required. The International Existing Building Code (IEBC), section 502.4, provides provisions for prescriptive compliance allowing existing structural elements carrying gravity load to carry up to 5% more capacity than existing conditions. No additional stiffening or supports are required at those units.

For units where the equivalent PSF is greater than 105% of the existing unit weights, recommendations for supports or stiffening are provided in order to achieve adequate structural capacity for the new units.

CU-1	Existing	New
Length, inches	99.5	99
Width, inches	88.75	80
Operating Weight, pounds	3309	2449
Equivalent PSF	53.96	44.53
(% of Existing)		(82.5%)

CU-4	Existing	New
Length, inches	66	99
Width, inches	43	58
Operating Weight, pounds	900	1891
Equivalent PSF	45.67	47.42
(% of Existing)		(103.8%)

BRYAN • BRENHAM • FORT WORTH • GEORGETOWN • SAN ANTONIO

CIVIL CONSTRUCTION MATERIALS TESTING GEOTECHNICAL STRUCTURAL SURVEYING

			7
1	ים-י		I CARD
7	-	0 7	

Figure 1: Site View

CU-2 & CU-3	Existing	New
_ength, inches	99.5	99
Width, inches	88.75	80
Operating Weight, pounds	3259	2496
Equivalent PSF	53.14	45.38
(% of Existing)		(85.4%)

CU-5 & CU-6	Existing	New
Length, inches	59.2	35.5
Width, inches	45.5	35.5
Operating Weight, pounds	430	340
Equivalent PSF	22.99	38.85
(% of Existing)		(169.0%)

## **RESULTS & RECOMMENDATIONS**

BRYAN • BRENHAM • FORT WORTH • GEORGETOWN • SAN ANTONIO

CIVIL CONSTRUCTION MATERIALS TESTING GEOTECHNICAL STRUCTURAL SURVEYING

Units CU-1, CU-2, CU-3, and CU-4 are all within acceptable demand vs capacity limits per the known existing unit parameters. No additional stiffening or supports are needed for these unit locations.

Units CU-5 and CU-6 are outside the allowable increase in load demand based on the IEBC guidelines as-is; however, if the support frames for the Existing CU-5 and CU-6 units are utilized and the load for the new units is spread across the larger footprint, the equivalent PSF for units CU-5 and CU-6 becomes 18.18 PSF, which results in a percentage of existing of 79.07%, therefore no additional stiffening would be required. If additional support members are required for the new CU-5 and CU-6 units in order to utilize the existing frames, structural steel angles, L4x4x1/4 minimum, shall be installed between main support frame members for the new units to bear on. Structural angles shall be attached to the existing support frame with welded A36 steel shear tabs, min. <sup>1</sup>/<sub>4</sub>" in thickness. Contact Gessner Engineering if a non-welded option is required due to site limitations.

As a general recommendation, all existing supports to be reused shall be cleaned of any rust or debris and any damage repaired, as able. Where rust is present, Gessner Engineering recommends the surface of all rusted steel be cleaned to meet The Society of Protective Coatings (SSPC) standard SP3. Remove all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter by power wire brushing, power sanding, power grinding, power tool shipping, and/or power tool descaling. Primer and paint shall then be applied to the steel. Primer shall be a lead and chromate free, non-asphaltic and rust-inhibiting primer. Paint shall be a high-zinc dust content paint with dry film containing not less than 93 percent zinc dust by weight, complying with SSPC. Do not begin application of coatings until substrates have been properly prepared. Apply all coatings with manufacturer specifications in mind, using methods recommended by manufacturer. Regardless of the number of coats specified, apply as many coats as necessary for complete and uniform appearance. New steel components shall be coated with the same procedures used for any existing steel. Unit attachments to support frames or new steel shall be per the manufacturer's recommendations.

9 of 10

5



OF TOTAL SHEETS

SHEET SHEET INDEX

# DUCT SCHEDULE

DUCT DIMENSION (INCHES)	1" POS OR NEG NO REINFORCE	2" POS OR NEG NO REINFORCE	4" POS OR NEG NO REINFORCE	6" POS OR NEG NO REINFORCE	LONG. ROUND PRESSURE DUCT	SPIRAL ROUND PRESSURE DUCT	LONG. ROUND NEG. 2" DUCT
<= 10	26 GA	26 GA	22 GA	24 GA	28 GA	28 GA	28 GA
11 - 12	26 GA	26 GA	22 GA	20 GA	28 GA	28 GA	26 GA
13 - 14	26 GA	24 GA	20 GA	20 GA	28 GA	28 GA	24 GA
15 - 16	26 GA	24 GA	20 GA	18 GA	26 GA	26 GA	24 GA
17 - 18	24 GA	22 GA	18 GA	18 GA	26 GA	26 GA	22 GA
19 - 20	24 GA	20 GA	18 GA	16 GA	24 GA	26 GA	22 GA
21 - 22	22 GA	18 GA	18 GA	16 GA	24 GA	26 GA	22 GA
23 - 24	22 GA	18 GA	18 GA	16 GA	24 GA	26 GA	20 GA
25 - 26	20 GA	18 GA	16 GA	REINFORCE REQUIRED	24 GA	24 GA	18 GA
27 - 28	18 GA	18 GA	16 GA	REINFORCE REQUIRED	24 GA	24 GA	18 GA
29 - 30	18 GA	18 GA	16 GA	REINFORCE REQUIRED	22 GA	24 GA	18 GA
31 - 36	18 GA	16 GA	REINFORCE REQUIRED	REINFORCE REQUIRED	22 GA	24 GA	16 GA
37 - 42	16 GA	REINFORCE REQUIRED	REINFORCE REQUIRED	REINFORCE REQUIRED	22 GA	24 GA	16 GA
43 - 48	16 GA	REINFORCE REQUIRED	REINFORCE REQUIRED	REINFORCE REQUIRED	20 GA	22 GA	REINFORCE REQUIRED

A654 AND A294 AND OF MINIMUM YIELD STRENGTH OF 30 KSI.

1. TABLE INDICATES NON-REINFORCED G-60 GALVANIZED STEEL OF LOCKFORMING GRADE CONFORMING TO ASTM STANDARDS 2. ALUMINUM DUCTWORK SHALL COMPLY WITH SMACNA DUCT CONSTRUCTION TABLE 2-50 - ALUMINUM DUCTWORK SHALL NOT SIMPLY BE INCREASED BY 2 GAUGE THICKNESSES.

3. DUCT SHOP DRAWINGS OF <sup>1</sup>/<sub>4</sub>" SCALE OR LARGER SHALL BE SUBMITTED, SHOWING REINFORCEMENT, JOINTS, HANGERS AND PRESSURE CLASSES OF CONSTRUCTION AS A MINIMUM. APPROVED SHOP DRAWINGS ARE REQUIRED PRIOR TO ANY INSTALLATION OF DUCTWORK. ANY WORK INSTALLED PRIOR TO APPROVED SHOP DRAWINGS IS ENTIRELY AT THE

CONTRACTOR'S RISK.

4. UNLESS OTHERWISE NOTED ON THE DRAWINGS, DUCTWORK PRESSURE CLASS IS ESTABLISHED BY THE SCHEDULED EQUIPMENT FAN ESP. BRANCH RUNOUTS TO AIR DEVICES ARE 1" PRESSURE CLASS UNLESS OTHERWISE NOTED. RUNOUTS TO AIR TERMINAL DEVICES ARE 2" PRESSURE CLASS UNLESS OTHERWISE NOTED.

5. CROSS BREAK ALL DUCT 20" AND LARGER AND 20 GAUGE OR LESS WITH MORE THAN 10 SQ FT OF PANEL AREA. 6. ALL DUCT THICKNESS SCHEDULED ASSUME NO REINFORCEMENT. CONTRACTOR MAY EMPLOY REINFORCEMENT COMPLIANT

WITH SMACNA DUCT CONSTRUCTION STANDARDS TO REDUCE INSTALLED DUCT THICKNESS. 7. WHERE SPECIFIED OR INDICATED ON DRAWINGS, DUCT LINER SHALL BE INSTALLED COMPLIANT WITH SMACNA S2.X SERIES OF NOTES. DUCT LINER SHALL NOT REDUCE THE DESIGN DUCT INSIDE DIMENSIONS.

DUCT SEALING

SEAL CLASS	SEALING REQUIREMENTS	APPLICABLE STATIC PRESSURE CONSTRUCTION CLASS
A	CLASS A: ALL TRAVERSE JOINTS, LONGITUDINAL SEAMS, AND DUCT WALL PENETRATIONS	4" WC AND UP
В	CLASS B: ALL TRAVERSE JOINTS AND LONGITUDINAL SEAMS ONLY NOTE THAT ALL DUCTWORK SHALL BE CLASS A PER IMC 603.9, IEEC C403.2.7.1	3" WC AND UP
С	CLASS C: TRAVERSE JOINTS ONLY NOTE THAT ALL DUCTWORK SHALL BE CLASS A PER IMC 603.9, IEEC C403.2.7.1	2" WC AND UP
1. ANY VA REQUIR 2. ALL DUC	V SYSTEM DUCT UPSTREAM OF THE VAV BOX SHALL MEET CLASS C UNLESS A HIG ED. CTWORK CONSTRUCTED 4" WC AND HIGHER SHALL BE PRESSURE TESTED PER IEF	HER PRESSURE CLASS IS EC C403.2.7.1

DUCTWORK	SCHEDULE				
MATERIAL	SERVICE	LOCATION(S)			
METAL - EXTERNALLY INSULATED	OUTDOOR AIR	CONCEALED			
	SUPPLY AIR	CONCEALED			
	RETURN AIR	CONCEALED			
METAL - UNINSULATED	GENERAL EXHAUST	ALL			
	DRYER EXHAUST	ALL			
	RANGE HOOD EXHAUST	ALL			
METAL - DOUBLE WALL INTERNALLY INSULATED	OUTDOOR AIR	EXPOSED			
	SUPPLY AIR	EXPOSED			
	RETURN AIR	EXPOSED			
FLEXIBLE - INTERNALLY INSULATED	SUPPLY AIR, RETURN AIR	CONCEALED BRANCH CONNECTIONS NOT EXCEEDING 10 FEET			
GENERAL NOTES:					
1. REFER TO SPECIFICATIONS FOR FU 2. INSTALLED DUCT INSULATION THER 3. ALL DUCT WORK UNLESS OTHERWIS PRESSURE.	RTHER INFORMATION. MAL PERFORMANCE TO MEET SE NOTED SHALL BE INSTALLE	OR EXCEED R-6 IN UNCONDITIONED SPACES. D AS LOW PRESSURE , 3" W.C. OPERATING			

DUCTWORK	SCHEDULE			
MATERIAL	SERVICE	LOCATION(S)		
METAL - EXTERNALLY INSULATED	OUTDOOR AIR	CONCEALED		
	SUPPLY AIR	CONCEALED		
	RETURN AIR	CONCEALED		
METAL - UNINSULATED	GENERAL EXHAUST	ALL		
	DRYER EXHAUST	ALL		
	RANGE HOOD EXHAUST	ALL		
METAL - DOUBLE WALL INTERNALLY INSULATED	OUTDOOR AIR	EXPOSED		
	SUPPLY AIR	EXPOSED		
	RETURN AIR	EXPOSED		
FLEXIBLE - INTERNALLY INSULATED	SUPPLY AIR, RETURN AIR	CONCEALED BRANCH CONNECTIONS NOT EXCEEDING 10 FEET		
GENERAL NOTES:				
1. REFER TO SPECIFICATIONS FOR FU 2. INSTALLED DUCT INSULATION THER 3. ALL DUCT WORK UNLESS OTHERWIS PRESSURE.	RTHER INFORMATION. MAL PERFORMANCE TO MEET SE NOTED SHALL BE INSTALLE	OR EXCEED R-6 IN UNCONDITIONED SPACES. D AS LOW PRESSURE , 3" W.C. OPERATING		

 $\frown$ 

3

# 

AIR HANDLING UNIT DATA							
MARK	-	AHU 1	AHU 2	AHU 3	AHU 4	AHU 5	AHU 6
MANUFACTURER	-	DAIKIN	DAIKIN	DAIKIN	DAIKIN	DAIKIN	DAIKIN
MODEL	-	CAH030	CAH030	CAH030	CAH010	CAH010	CAH010
SUPPLY AIR QUANTITY	CFM	14500	14500	14500	4820	4000	4000
OUTSIDE AIR QUANTITY	CFM	2900	2175	2175	2410	600	600
EXT. STATIC PRESSURE	IN. W.C.	2.0	2.0	2.0	3.0	3.0	3.0
COOLING ENTERING AIR TEMP. DB/WB	°F / °F	80 / 65	79 / 64	79 / 64	88 / 69	79 / 64	79 / 64
COOLING LEAVING AIR TEMP. DB/WB	°F / °F	53 / 51	55 / 53	53 / 51	54 / 53	58 / 54	58 / 54
AHRI COOLING TOTAL CAPACITY	MBH	558	471	471	235	117	117
AHRI COOLING SENSIBLE CAPACITY	MBH	420	365	365	174	92	92
HEATING ENTERING AIR TEMP. DB	°F	60	63	63	46	62	62
HEATING LEAVING AIR TEMP. DB	°F	90	90	90	90	90	90
HEAT TOTAL CAPACITY	MBH	476	442	442	235	123	123
WATER TEMPERATURE EWT / LWT	°F / °F	160 / 160	160 / 160	160 / 160	160 / 160	160 / 160	160 / 160
WATER RATE / PRESSURE DROP	GPM / FT WC	46.9 / 15.1	43.0 / 7.0	43.0 / 7.0	23.2 / 1.1	11.9 / 1.3	11.9 / 1.3
ELECTRICAL CHARACTERISTICS	VOLTS/PHASE	480 / 3	480 / 3	480 / 3	480 / 3	480 / 3	480 / 3
BLOWER MOTOR / FAN ARRAY	HP	3 @ 6.6 HP	3 @ 6.6 HP	3 @ 6.6 HP	2 @ 4.4 HP	2 @ 4.4 HP	2 @ 4.4 HP
FAN CIRCUIT MCA / MOCP	AMPS	21.9 / 25	21.9 / 25	21.9 / 25	10.1 / 15	10.1 / 15	10.1 / 15
FILTER	-	MERV 8	MERV 8	MERV 8	MERV 8	MERV 8	MERV 8
WEIGHT	LBS	3700	3500	3500	1900	1900	1900
CONDENSING UNIT DATA							
MARK	-	CU 1	CU 2	CU 3	CU 4	CU 5	CU 6
MANUFACTURER	-	DAIKIN	DAIKIN	DAIKIN	DAIKIN	DAIKIN	DAIKIN
MODEL	-	RCS050D	RCS040D	RCS040D	RCS020D	DX11TA1204	DX11TA1204
NOMINAL TONNAGE	-	50	40	40	20	10	10
E.E.R.	-	11.0	11.3	11.3	12.3	11.2	11.2
REFRIGERANT TYPE	-	R-410A	R-410A	R-410A	R-410A	R-410A	R-410A
OUTDOOR TEMPERATURE RATING	°F	105	105	105	105	105	105
ELECTRICAL CHARACTERISTICS	VOLT/PHASE	460 / 3	460 / 3	460 / 3	460 / 3	460 / 3	460 / 3
COMPRESSOR - QTY / EACH	QTY @ RLA	4 @ 19.2	4 @ 16.7	4 @ 16.7	1 @ 19.2 2 @ 8.6	-	-
CONDENSER FAN	QTY @ FLA	4 @ 2.6	4 @ 2.6	4 @ 2.6	2 @ 2.6	-	-
MCA / MOCP	AMPS / AMPS	93.3 / 110	80.6 / 90	80.6 / 90	46.0 / 60	22 / 35	22 / 35
WEIGHT	LBS	2450	2500	2500	1900	350	350
NOTES / ACCESSORIES:	-	ALL	ALL	ALL	ALL	ALL	ALL

NOTES / ACCESSORIES:

MINIMUM 1 STAGE OF COOLING PER UNIT TO HAVE HGBP. FURNISH WITH SINGLE POINT POWER CONNECTION, COOLING DOWN TO 0 DEG F. 2. COORDINATE WITH AND INTEGRATE TO EXISTING BUILDING DDC SYSTEM.

3. COORDINATE WITH ELECTRICAL TO FURNISH DISCONNECTS.

4. FURNISH AND INSTALL WITH EQUIPMENT ISOLATION SUPPORTS LEVELED ON EXISTING EQUIPMENT PAD (AHU'S) AND ON EXISTING ROOFTOP EQUIPMENT SUPPORTS (CU'S). INSTALLATION OF REPLACEMENT EQUIPMENT NOT ITALICIZING EXISTING SUPPORTS MUST BE APPROVED BY THE STRUCTURAL ENGINEER. 5. PROVIDE REFRIGERANT LINESET SIZED FOR ASSOCIATED LINE LENGTH AND LIFT PER MANUFACTURER'S INSTRUCTIONS. INSULATE AND INSTALL ALUMINUM

JACKET. 6. 50 TON UNITS SHALL HAVE 4 CAPACITY STAGES, 40 TON SHALL HAVE 3 STAGES, 10 TON SHALL HAVE 2 STAGES.

7. AHU'S BASIS OF DESIGN IS FAN WALL. SCHEDULED FAN HP AND FAN FLA ARE TOTALS FOR THE UNIT. 8. CONTRACTOR TO TAB EXISTING AHU'S PRIOR TO DEMOLITION. BALANCE REPLACEMENT UNITS TO SAME CAPACITIES VIA FAN DRIVE ADJUSTMENTS.

PLAN MARK	MODEL NO.	TYPE	CFM	E.S.P. (IN WC)	FAN RPM	MOTOR RPM	MOTOR HP	V/Ø	DRIVE TYPE	FAN SERVICE	ADDITIONAL ACCESSORIES
RF 4	BCRU	ROOFTOP DOWNBLAST	22,000	0.125	408		3	480 / 3	BELT	ECONOMIZER RELIEF	1, 3, 4, 5
RF 5	BCRU	ROOFTOP DOWNBLAST	22,000	0.125	408		3	480 / 3	BELT	ECONOMIZER RELIEF	1, 3, 4, 5
RF 6	BCRU	ROOFTOP DOWNBLAST	22,000	0.125	408		3	480 / 3	BELT	ECONOMIZER RELIEF	1, 3, 4, 5
NOTES: 1. BAS	SIS OF DESIGN	N - TWIN CITY FANS	5	11		1					1
ACCESS	<u>SORIES:</u> CKDRAFT DAN	1PER	8. INLE	SCREEN			15. WE	ATHER CO	VER	22. H	IINGED FRAMES

10 of 10

5







## WACO CONVENTION CENTER HVAC REPLACEMENT PHASE 2 100 WASHINGTON AVE WACO, TX 76701 OWNER

CITY OF WACO
PO BOX 2570
WACO, TX 76710
MR. BRIAN GLADE - PROJECT MANAGER

В

\_\_\_\_



## MARK DATE DESCRIPTION PROJECT NO: GTX# 22-16

CAD DWG FILE: DRAWN BY: CHK'D BY: COPYRIGHT:

22-16 WACO HVAC.DWG #### ####

SHEET TITLE SCHEDULES

## M 601

#### Sheet sheet index

OF TOTAL SHEETS